

CLAIMS

1. A semiconductor device comprising an insulation film consisting of a fluoridation carbon film that has been subjected to thermal history of 420 °C or lower, wherein
an amount of hydrogen atoms included in the fluoridation carbon film is 3 atomic % or less before the fluoridation carbon film is subjected to the thermal history.
2. A semiconductor device according to claim 1, wherein the insulation film is an interlayer insulation film.
3. A manufacturing method of a semiconductor device comprising the steps of:
generating a plasma of a source gas consisting of a chemical compound of carbon and fluorine and including hydrogen atoms of 1×10^{-3} atomic % or less, and
forming an insulating film consisting of a fluoridation carbon film that includes hydrogen atoms of 3 atomic % or less, on a substrate, by using the plasma of the source gas.
4. A manufacturing method of a semiconductor device according to claim 3, further comprising:
heating the substrate at a temperature of 420 °C or lower, after the step of forming the insulating film.
5. A manufacturing method of a semiconductor device according to claim 3 or 4, wherein
the chemical compound of carbon and fluorine is C_5F_8 .
6. A gas for a plasma CVD process, comprising an unsaturated carbon fluoride compound and a chemical compound including a hydrogen atom, the amount of the chemical compound including a hydrogen atom being 90 weight ppm or less.
7. The gas for the plasma CVD process according to claim 6,

wherein

the amount of the chemical compound including a hydrogen atom is 10 weight ppm or less.

8. The gas for the plasma CVD process according to claim 6, further comprising

water in the amount of 3 weight ppm or less.

9. The gas for the plasma CVD process according to any of claims 6 to 8, wherein

the unsaturated carbon fluoride compound is octafluorocyclopentene, hexafluoro-2-pentyne, or hexafluoro-1,3-butadiene.

10. A manufacturing method of the gas for the plasma CVD process according to any of claims 6 to 9, comprising the step of

bringing a composition of an unsaturated carbon fluoride compound and a chemical compound including a hydrogen atom in contact with burned adsorbent.

11. A forming method of an insulation film comprising the step of:

conducting a plasma CVD process by using the gas for the plasma CVD process according to any of claims 6 to 9.

12. A gas for a plasma CVD process, comprising an unsaturated carbon fluoride compound, and hydrogen atoms in the amount of 1×10^{-3} atomic % or lower.

13. A gas for a plasma CVD process, comprising an unsaturated carbon fluoride compound, and water in the amount of 0.5 weight ppm or less.

14. The gas for the plasma CVD process according to claim 13, wherein

the amount of water is 0.1 weight ppm or less.